

CLAIMS:

1. A microelectrode comprising a diamond layer formed from electrically non-conducting diamond and containing one or more pins or projections of electrically conducting diamond extending at least partially through the layer of non-conducting diamond and presenting areas of electrically conducting diamond.
2. A microelectrode according to claim 1, wherein the pins or projections extend to a surface of the layer of electrically non-conducting diamond presenting areas of electrically conducting diamond co-planar with that surface.
3. A microelectrode according to claim 1, wherein the areas of electrically conducting material are recessed relative with a surface of the diamond layer creating a well or reservoir in that surface.
4. A microelectrode according to any one of claims 1 to 3, wherein pins or projections of electrically conducting diamond present circular areas of electrically conducting diamond.
5. A microelectrode according to claim 3, wherein the well or reservoir contains an additive which presents a surface co-planar with the surface in which the well or reservoir is created.
6. A microelectrode according to claim 5, wherein the additive modifies the sensitivity or selectivity of the electrode behaviour.
7. A microelectrode according to claim 5 or claim 6, wherein the additive is an electrochemical (bio-)chemical.
8. A microelectrode according to claim 1, wherein the areas of electrically conducting diamond are in electrical connection with one

-18-

or other surfaces of the diamond layer through which they can be connected to an external circuit.

9. A microelectrode according to claim 1, wherein the areas of electrically conducting diamond are internally electrically connected within the diamond layer into one or more groups of electrodes.
10. A microelectrode according to claim 1, wherein the areas of electrically conducting diamond are externally electrically connected into one or more groups of electrodes.
11. A microelectrode according to claim 1, wherein the diamond is synthetic single crystal or polycrystalline diamond.
12. A microelectrode according to claim 1, wherein the diamond is CVD synthetic single crystal or polycrystalline diamond.
13. A microelectrode according to claim 2, wherein the areas of electrically conducting diamond and co-planar surface are smooth.
14. A microelectrode according to claim 2, wherein the areas of electrically conducting diamond and co-planar surface have a surface roughness of less than 100 nmRa.
15. A microelectrode according to claim 1, wherein the electrically conducting diamond is boron doped diamond.